

## **REMARKS**

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the pending claims and the following remarks.

### **Status of the Claims**

Upon entry of the present amendment, claims 1-12 and 15-20 will be pending in the present application. Claims 1-12, 15-16, and 18-19 have been amended. Claims 13-14 have been cancelled.

No new matter has been added by way of the above amendments. Support for the recitations in claims 1 and 5 can be found in the present specification, *inter alia*, at pages 15-16 as well as the examples. Claims 4 and 10 were amended in accordance with the Examiner's suggestions and also find support in the examples of the present specification. Support for the recitations in claim 7 can be found in claims 13-14 as originally filed as well as Examples 1 and 2 of the present specification. Claims 1-12, 15-16, and 18-19 have been amended to recite that the claims are directed to a composition comprising a high-purity alicyclic epoxy compound. The Examiner should note that the present claims have always been directed to compositions rather than to compounds per se. Thus, the invention remains unchanged.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

### **Issues under 35 U.S.C. § 112, second paragraph**

The Examiner has rejected claims 4 and 7-15 under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner states that the parentheses in claims 4 and 10 should be removed. In addition, the Examiner requests that the acronyms "APHA" in claims 4 and 10 and "WFE" in claim 7 be removed.

The claims have been amended to correct these issues. These amendments are clearly non-narrowing claim amendments. Thus, Applicants respectfully submit that the amendments overcome the outstanding rejection and that the rejection be removed.

**Issues under 35 U.S.C. § 103**

1) The Examiner has rejected claims 1-6 and 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Takai '618 (US 2003/0059618) in view of Boehme et al. '532 (US Patent 4,849,532).

2) The Examiner has rejected claims 7-15 under 35 U.S.C. § 103(a) as being unpatentable over Takai '618 in view of Boehme '532 when taken with Thiele '872 (US Patent 4,344,872).

Applicants respectfully traverse, and reconsideration and withdrawal of these rejections are respectfully requested.

As the Examiner admits, Takai '618 does not state that "the concentration of high-molecular-weight components having an elution time shorter than that of the alicyclic epoxy compound represented by the general formula (I)...is 5.5% or less" as recited in independent claim 1. The Examiner also admits that Takai '618 does not teach that a "color hue...is 60 or less" as recited in claim 4.

To overcome this deficiency, the Examiner asserts that it is implicit that the composition of Takai '618 would also have these properties and that Applicants have the burden to present evidence to refute this position.

This evidence can be found in the present specification. According to MPEP 2145, rebuttal evidence and arguments can be presented in the specification, *In re Soni*, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995). Office personnel should consider all rebuttal arguments and evidence presented by Applicants. See, e.g., *Soni*, 54 F.3d at 750, 34 USPQ2d at 1687 (error not to consider evidence presented in the specification). Rebuttal evidence may also include evidence that the claimed invention yields unexpectedly improved properties or properties not present in the prior art. Rebuttal evidence may consist of a showing that the claimed compound possesses unexpected properties. *Dillon*, 919 F.2d at 692-93, 16 USPQ2d at 1901.

The process of preparing the epoxy compound in Example 1 of Takai '618 is the same as the process of preparing the epoxy compound of Comparative Example 1 in the present specification.

Therefore, the product having the alicyclic epoxy compound as a main ingredient obtained in Example 1 of Takai '618 should have the color hue, as measured by American Public Health Association value, of 90. Also, the concentration of high-molecular-weight components each having an elution time shorter than that of the alicyclic epoxy compound (IA) in detection by GPC analysis should be 12.5% in terms of the area ratio, as described in Comparative Example 1 in the present specification.

Accordingly, the product of Takai '618 contains higher concentrations of high-molecular-weight parts having an elution time shorter than that of the alicyclic epoxy compound detected by a GPC analysis and is not sufficient in a color hue, as measured by American Public Health Association value.

In the Advisory Action of November 26, 2008, the Examiner argued that the limitations of concentration of high molecular weight components and color hue are directed to a composition which contains the claimed compound and not directed to the compound itself. The pending claims have been amended to clarify that they are directed to a composition comprising a high-purity alicyclic epoxy compound. As such, Takai '618 fails to disclose these limitations.

The Examiner also admits that Takai '618 neither teaches nor suggests "the purification by distillation" as recited in claim 6. However, the Examiner relies on Boehme '532 in order to overcome this deficiency.

Boehme '532 recites:

Thus, for example, the preparation of the previously described diepoxide by reaction of its parent diolefin with acetaldehyde monoperacetate or *peracetic acid in ethyl acetate* or acetone *as solvent* is old in the art (U.S. Pat. Nos. 2,716,123 and 2,804,473). At first glance, this type of operation seems very attractive. Nevertheless, it is **not** an optimal alternative due to the acetic acid which occurs as a coupled product. The acid must be separated from the reaction mixture and purified at considerable cost and its recovery is therefore **not** economically feasible.

The yields obtainable according to these known processes of 85.5% and a product purity of 86% are also very **unsatisfactory** (U.S. Pat. No. 2,716,123, Example IV). Moreover, the process of oxidizing acetaldehyde is not without risk, because explosive intermediates arise with this method (col. 2, lines 9-27; emphasis added).

Accordingly, Boehme '532 actually teaches away from being combined with Takai '618 since Boehme '532 recommends against using peracetic acid in ethyl acetate as solvent. As such, Boehme '532 also teaches away from the present invention.

Boehme '532 also states, "Notwithstanding the negative expectations of the prior art, the invention has as its object the preparation of the abovementioned diepoxide utilizing *perpropionic acid* to obtain high yields and at the same time avoidance of interfering by product formation" (col. 2, lines 54-58).

In stark contrast, the present invention recites that "the alicyclic epoxy compound is produced from a corresponding alicyclic olefin compound with *a peracetic acid in a solvent of an ethyl acetate solution.*"

In view of the above, neither Takai '618 nor Boehme '532 disclose the present invention. Although Applicants respectfully submit that Takai '618 and Boehme '532 are not properly combinable, even if combined, the cited references fail to disclose each and every element of independent claim 1, from which claims 2-6 and 16-20 ultimately depend. Specifically, the cited references fail to disclose that "the concentration of high-molecular-weight components having an elution time shorter than that of the alicyclic epoxy compound represented by the general formula (I)...is 5.5% or less" or that a "color hue...is 60 or less."

With respect to claims 7-15, these claims contain similar limitations as those described above which are not disclosed by Takai '618 or Boehme '532. Applicants respectfully submit that Thiele '872 does not overcome the deficiencies of these references.

In addition, independent claim 7 recites, *inter alia*, that "the purification by distillation is carried out at a *heating temperature ranging from 180 to 350°C* and at a pressure of 50 to 0.01 Torr" (emphasis added).

In stark contrast, Boehme '532 discloses that the distillation takes place at 50-150°C (col. 4, lines 60-65). Thus, the cited prior art fails to disclose the heating temperature range of the present invention.

Regarding the different linking group, the present specification discloses that "the CEL-2021P and CEL-2081 have hydrolyzability because of *having an ester bond in the molecule*. Therefore, when they are used under high temperature and humidity conditions or such a condition that a strong acid occurs, *a cured product may be reduced in the physical property*. Thus, there has been a demand for an epoxy compound having an alicyclic skeleton *with no ester bond in the molecule*" (page 2; emphasis added).

Boehme '532 does not disclose the properties of the articles cured from the obtained epoxy compounds.

Further, because the present epoxy compound does **not** have *an ester bond in the molecule*, a higher heating temperature ranging *from 180 to 350°C* becomes possible.

Therefore, the epoxy compounds of Boehme '532 which have an ester bond in the molecule differs from the epoxy compounds of the present invention, which excel in the property of the film surface immediately after irradiation and excel in pencil hardness after 20 min. (scratch), as discussed below.

In the present invention, a feature in claim 1 is to obtain a high-purity for alicyclic compounds. Conventional alicyclic compounds have only low-purity and are not sufficient to obtain transparent materials.

Relevant to this § 103(a) rejection, *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966) has provided the controlling framework for an obviousness analysis, wherein a proper analysis under § 103(a) requires consideration of the four *Graham* factors. One such factor includes the evaluation of any evidence of secondary considerations (e.g., commercial success; unexpected results). 383 U.S. at 17, 148 USPQ at 467. In this regard, Applicants respectfully submit that the present invention has achieved unexpected results, whereby such results rebut any asserted *prima facie* case of obviousness. See *In re Corkill*, 711 F.2d 1496, 226 USPQ 1005 (Fed. Cir. 1985). Also, the comparative showing need not compare the claimed invention with all of the cited prior art, but only with the closest prior art. See MPEP 716.02(b) and 716.02(e).

The cured articles obtained in Examples 1-3 show high Tg value of not less than 300 as shown in Table 1. On the other hand, the cured article obtained in Comparative Example 1 shows low Tg value of 198.6.

Additionally, the cured articles obtained in Examples 4-6 are transparent. However, the cured article obtained in Comparative Example 2 is yellowing, as shown in Table 2.

Further, the cured articles obtained in Examples 7-9 excel in the property of the film surface immediately after irradiation and excel in pencil hardness after 20 min. (scratch) in contrast to the cured articles obtained in Comparative Examples 3-4, as shown in Table 3.

For the reasons given above, a *prima facie* case of obviousness has not been established, and withdrawal of the outstanding rejections is respectfully requested. To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be disclosed by the prior art. As discussed above, the cited references fail to disclose all the claim limitations of independent claims 1 and 7, and those claims dependent thereon.

Accordingly, the combination of references does not render the present invention obvious because the cited references do not disclose at least one feature of the present invention and its effects. Furthermore, the cited references or the knowledge in the art provide no reason or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed. Any contentions of the USPTO to the contrary must be reconsidered at present.

Alternatively, due to the unexpected results as achieved by the present invention, the rejections have been overcome. Reconsideration and withdrawal of these rejections are respectfully requested.

### **Obviousness-Type Double Patenting**

1) The Examiner has provisionally rejected claims 1-3 under the doctrine of obviousness-type double patenting over claims 1 and 3-5 of co-pending Application No. 11/792,782.

2) The Examiner has also provisionally rejected claims 1-3 under the doctrine of obviousness-type double patenting over claim 5 of co-pending Application No. 10/883,162.

As the above rejections are provisional rejections with respect to later-filed copending applications, no action is required by Applicants at this time. See MPEP 804, page 800-17.

**CONCLUSION**

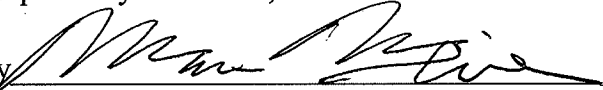
A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case clearly indicating that each of claims 1-12 and 15-20 are allowed and patentable under the provisions of title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad M. Rink, Reg. No. 58,258 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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